Quantum Mechanics (PHYS 150)

Lecture: Sequoia 140
Tues, Thurs 10:30 – 11:45

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and by appointment

Course Summary

Physics 150 is an intermediate and rigorous course that covers the subject of quantum mechanics. We will cover the fundamental wavenature of particles, the Schrödinger equation, mathematical formalisms, and applications of quantum mechanics to simple systems (i.e. particle in box, harmonic oscillator, and hydrogen atom). Angular momentum algebra and perturbation theory (time independent) will also be covered.

Prerequisites

Math 45 (Diff. Eqns), Phys 106 (Intro to Mod. Phys.), Phy 110 (Classical Mech.). If you haven't met there prerequisites, but still feel you are prepared, please come speak to me.

Required Texts

David J. Griffiths, *Introduction to Quantum Mechanics, 2nd Ed.* Pearson Prentice Hall, 2005.

Recommended Texts

Murray R. Spiegel, *Schaum's Mathematical Handbook of Formulas and Tables.* McGraw-Hill, 1999. (This or similar text will be very useful. Not in the textbook stacks).

Albert Messiah, *Quantum Mechanics.* Dover, 1999. This is a relatively inexpensive classic text. Originally two volumes, it is worth considering adding to your collection with a $29.95 price. See www.doverpublications.com to order it.

Grading

Homework 15 %

Homework will be assigned each week and will be collected on Tuesday at the start of class. Some problems will be out of the textbook, others will be from me. The assignment will be on my website. Each set will consist of about a half dozen problems. On Tuesday evening, detailed solutions will be posted on my website. As such, I will leave it to you to check the details of your work. I will be grading

homework on a three point scale: 2 points – well attempted; 1 point – marginal, effort; 0 points – I'm not happy. You are welcome to work together on assignments, however if it becomes obvious that someone is just copying the work of others (classmates or other sources), I will enforce the department's academic dishonesty policy (see below).

Midterm Exams 16 $^{2}/_{3}$ % Each

Three one hour-long exams, each worth 100 points. The exams are tentatively scheduled for Oct. 4, Oct. 25, and Nov. 20, but are subject to change. You will be allowed <u>one</u> side of an 8.5" x 11" sheet of paper on each midterm.

Final Exam 35 %

Two hour-long final. Because of the importance of some of the material introduced after the third midterm exam, one half of the points on this exam will be from these topics. The final is scheduled for 10:15 on Thursday, December 21. <u>Both</u> sides of a single 8.5" x 11" sheet of paper are allowed.

I intend to use standard percentages in assigning grades: A = 90-100%; B = 80-90%, etc. However, I will take into consideration the distribution of scores prior to making a final decision.

Academic Dishonesty Statement

The Department of Physics and Astronomy has unanimously approved the following statement:

"The faculty of the Department of Physics and Astronomy will not tolerate academic dishonesty. Falsification of data, copying, unauthorized collaboration, plagiarism, alteration of graded materials, or other actions (as described in, but not necessarily limited to the CSUS Policy Manual) *will be promptly reported to the Office of Student Affairs*. The offending student will be penalized on the assignment in question. Serious infractions will result in course failure and a recommendation for administrative sanctions."

If you have any questions regarding this statement, please come and speak with me about it.

Physics 150: Fall 2007

Week	Date	Material	Date	Material
1	9/4	Syllabus History Failures	9/6	DeBroglie Bohr
2	9/11	Schroedinger Introduction	9/13	Probability Normalization Expectation Values
3	9/18	Separation of Variables	9/20	Particle in a Box 1
4	9/25	Particle in a Box 2 Finite Box, 3D	9/27	Free Particle and Scattering 1 Steps and Walls
5	10/2	Free Particle and Scattering 2 Delta potentials and other	10/4	**Exam 1: Thru 9/25**
6	10/9	Harmonic Oscillator 1	10/11	Harmonic Oscillator 2
7	10/16	Harmonic Oscillator 3	10/18	Formalism 1
8	10/23	Formalism 2	10/25	**Exam 2: Thru 10/16**
9	10/30	Formalism 3	11/1	Formalism 4
10	11/6	3D with Spherical Symmetry 1 Spherical Harmonics Radial Equation	11/8	3D with Spherical Symmetry 2 Central Force 3D Box / 2 Bodies
11	11/13	Hydrogen Atom 1	11/15	Hydrogen Atom 2
12	11/20	**Exam 3: Thru 11/8**	11/22	Thanksgiving Holiday
13	11/27	Angular Momentum Algebra	11/29	Angular Momentum Algebra
14	12/4	Spin	12/6	Adding Angular Momenta
15	12/11	Time Independent Perturbation Theory Applications to 1D	12/13	Time Independent Perturbation Theory Applications to 1D
16	12/20 (Thurs)	Final Exam 10:15 - 12:15		